Patent Claims

1. Process for forming drops of precursors of thermoplastic polyesters or copolyesters as molten monomer, oligomer, monomer/glycol mixture or after partial polycondensation and melting to give a molten precursor, in which the precursor formed into drops is introduced into a gaseous medium, characterized in that the gaseous medium, after entry of the precursor formed into drops into the gaseous medium, accelerates the crystallization process of the precursor and brings about the crystallization state of the precursor in an accelerated manner by holding the drop-form precursor at a temperature above 100°C and below its melting point for a limited time until crystallization of the drop at the surface of the precursor is complete.

2. Process according to Claim 1, characterized in that the gaseous medium employed is air.

3. Process according to Claim 1, characterized in that the gaseous medium employed is a low-oxygen atmosphere.

4. Process according to Claim 1, characterized in that the gaseous medium employed is an inert gas.

5. Process according to Claim 1, characterized in that the gaseous medium employed is essentially nitrogen.

6. Process according to one of the preceding claims, characterized in that the gaseous medium is passed in countercurrent to a fall zone of the precursor formed into drops.

7. Process according to Claim 6, characterized in that the gaseous medium is introduced under temperature control into the fall zone of the precursor formed into drops at the lowest level of the fall zone.

8. Process according to Claim 7, characterized in that the temperature control of the gaseous medium takes place by means of a heat exchanger, and the gaseous medium is circulated.

9. Process according to one of the preceding claims, characterized in that the precursor in molten form is formed into drops by vibration excitation.

10. Process according to one of the preceding claims, characterized in that the precursor having an intrinsic viscosity in the range from 0.05 to 0.3 dl/g is formed into drops.

11. Process according to one of the preceding claims, characterized in that the precursor is formed into drops having a diameter of from 0.3 to 3 mm.

12. Process according to one of the preceding claims, characterized in that the precursor is formed into drops whose diameter is to the extent of greater than 80% by weight in the region of twice the nozzle diameter, and a diameter less than the nozzle diameter occurs to the extent of less than 3% by weight and a diameter greater than three times the nozzle diameter occurs to the extent of less than 10% by weight of the precursor formed into drops.

13. Process according to one of the preceding claims, characterized in that a dust-particle content of less than 1% by weight of the precursor formed into drops occurs during drop formation.

14. Process according to one of the preceding claims, characterized in that a low-viscosity precursor having an intrinsic viscosity of less than 0.15 is formed into drops in an environment with fine polyester particles, resulting in coating of the drops at the surface with polyester particles, which promotes crystallization and prevents the solidified drops from sticking together.

15. Apparatus for carrying out the process according to one of Claims 1 to 14, where the apparatus comprises:

a nozzle head (1) which forms drop-form pellets (3) from the precursor by vibration excitation of the melt (2),

a fall tower (4), in which the temperature of the precursor formed into drops can be controlled in a countercurrent of the gaseous medium,

a heat exchanger (5), which is arranged in the base region of the fall tower (4) and heats or cools the gaseous medium in order to regulate it to a uniformly high inflow temperature,

a fan (6), which accelerates the gaseous medium in the fall tower (4) to a given flow rate, and

a return line (7), which feeds the gaseous medium to the heat exchanger (5) after leaving the fall tower (4).

16. Apparatus according to Claim 15, characterized in that the nozzle head (1) has nozzle apertures (8) which are vertically facing and ensure drop formation in the vertical direction by means of vibration excitation of the melt (2).

17. Apparatus according to Claim 15 or 16, characterized in that the heat exchanger (5) regulates the temperature of the gaseous medium to a feed temperature of greater than or equal to 30°C and less than or equal to 20°C [sic], preferably greater than or equal to 40°C and less than or equal to 100°C.

18. Apparatus according to one of Claims 15 to 17, characterized in that the fan (6) can be adjusted to a flow rate of from 0.3 to 1 m/s of the gaseous medium in the fall tower (4).

19. Apparatus according to one of Claims 15 to 18, characterized in that the fall tower (4) has a fall zone (9) of from 10 to 20 m, preferably from 12 to 15 m, for the precursor formed into drops.